Dr. W. C. C. Pakes, who has been appointed bacteriologist to the Transvaal Government. The council has resolved that, in order to keep a permanent record of the legacy left to the college by Mrs. Morton Sumner, the lecturer in geology be hereafter called the Morton Sumner lecturer in geology.

THE papers read at the recent conference of science teachers, arranged by the London Technical Education Board, are appearing in the *Technical Education Gazette*, with reports of some of the speeches. The January number of the *Gazette* contains addresses on the teaching of hygiene, by Miss A. Ravenhill; mental school hygiene, by Dr. F. Warner; and the teaching of natural history, by Mr. F. E. Beddard, F.R.S.

THE Technical Education Board of the London County Council report that the reorganisation of London University is already having a marked influence for good on the polytechnics and other institutions. The advanced classes in science and engineering are being revised and brought up to a higher standard, gaps in the curriculum are being filled up, and more students are being induced to enter upon systematic courses of study, extending over three or four years, instead of attending isolated classes. Complete degree courses, under teachers of the University, will shortly be available for evening students at several of the polytechnics. The due recognition of engineering and higher commercial subjects was provided for by the establishment of separate faculties, and the Senate has now approved courses of study in which students will proceed to the degrees of B.Sc. and D.Sc. The regulations for the economic or commercial degree enable it to be gained in such subjects as the history, principles and organisation of banking, insurance, railway and shipping transportation, international commerce, local government, statistics, &c. By means of the Council's aid, the Senate has now determined on (1) the organisation of an institute of advanced chemistry, both organic and inorganic, at one centre; (2) the provision of advanced teaching in engineering at two centres; (3) the systematic organisation of the teaching of modern languages at all the University centres, including the polytechnics, and beginning with German; (4) the provision of a professorship of education in connection with the Council's proposed day training college for teachers; and (5) the appointment of University teachers in economic history and theory, commercial geography and history, banking, statistics, foreign trade, &c.

SCIENTIFIC SERIAL.

Bulletin de l'Académie de Sciences de St. Pétersbourg, 5th series, vol. xii.—On the compound (so-called stationary) radiants of shooting stars, by Th. Bredikhine (in French). The supposed existence of stationary radiant points (or radiant points of long duration) is an obstacle against all more or less admissible theories of shooting stars. Taking advantage of the 918 meteoric orbits calculated by J. Kleiber in 1891, and of subsequent data, the author concludes that each stationary (or long duration) radiant consists of several individual radiants, even when these radiants do not much differ from each other in their dates; this means that each stationary radiant is a compound radiant which originates from several individual radiants, each of which has its own position in space and its own origin, and all of which are intersected by the orbit of earth. Thus, in the well-known radiant of β Persei he finds "thirteen or fourteen different orbits, *i.e.* as many different streams" (p. 102). The author examines next the theories of Profs. H. H. Turner and A. S. Herschel, and concludes that "the deductions of Prof. Turner are only admissible under the impossible supposition that the earth moves with a uniform speed along a straight line. But if the theory itself is inconsistent, its secondary complications, such as the spinning of the meteoritic stream, the resisting medium, &c., have no more signification" (p. 115). Applying his explanation next to the polar stationary radiants of Mr. Denning, the author shows that in the radiant ζ Draconis (No. 36 of catalogue A), one may recognise "twelve different individual streams (twelve comets) apparently composing one single stationary radiant." The author's final conclusion is:—"A stationary radiant does not originate from a single individual stream or from one single comet; it must be named a compound radiant, because it is produced by several comets or independent streams. The phenomenon is so simple that all complicated and artificial theories are useless and superfluous. . . . Thanks to the numerous and careful observations of Mr. Denning, the phenomenon has lost its supposed individuality and has become decomposable and explicable."—On photographic observations of the satellite of Neptune at Pulkova, by S. Kostinsky (Russian; with a plate).—Report on zoological researches at Sebastopol in 1899, by A. Kovalevsky: hypodermal fertilisation with the leeches; on *Batracobdella latastii*; on *Hedyle Tyrtowii* (n.sp.); on *Pseudovermis paradoxus*, Periasl.—On faint lines in stellar spectragrams, by A. Belopolsky.—On a MS. in Coptish language attributed to Dionysius Areopagita, by Oscar Lemm.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 23.—"Mathematical Contributions to the Theory of Evolution. XI.—On the Influence of Natural Selection on the Variability and Correlation of Organs." By Karl Pearson, F.R.S.

The influence of directed—natural or artificial—selection on the characters of a race is one which it is fundamental for the purposes of evolution to appreciate quantitatively. I have already shown in an earlier memoir of this series the effect of random selection, or what it is better to term random sampling, on the characters of a population. Isolation of a few individuals who form a random sample may produce very sensible modifications of race characters, but it is to directed selection that we must look for changes on the largest scale. The subject is a very broad and complex one—no less than the total effect upon a population containing individuals at all ages of a selective death-rate applied for a long period and a function not only of the organs of each individual, but of the relationship of these organs to each other, and of the stage of growth of the individual. In the present memoir, attention is confined to the influence of selection in altering a complex of organs, no reproduction taking place during the selection.

A very definite distinction is at once reached, namely, that between directly and indirectly selected organs. It may be said that, although it is possible for the recruiting sergeant to select stature, and in so doing differentiate the arm-length of his troop from that of the general population, yet that in natural selection we are given only the modified organs, and so we cannot tell which of them have been directly and which indirectly selected. Both are changed; how discover which was the source of the change? The answer is: In the same manner as we could distinguish between two recruiting sergeants, one of whom selected his troop from the general population by stature, and the other by cubit; in either case the stature and cubit would be both modified, but the mathematical theory of regression would enable us to distinguish between the methods of operating of the two men, and even between them and one who selected by *both* stature and cubit at once. The mathematical theory as developed in this paper shows us that, although the whole complex of characters may have been changed, still, if direct selection has only occurred in p out of n possible cases, there will be certain of the partial regression coefficients which remain unmodified and which will theoretically enable us to distinguish among the whole group of differentiated organs, between those directly selected and those modified only because they happen to be correlated with the directly selected organs. Thus the distinction becomes one of singular importance, for though the selection of a few organs modifies the means, variabilities and correlations possibly of the whole complex of characters, certain functions of those quantities remain constant, and such constants ought to be discoverable, at any rate in theory, and should serve as the criterion of a common origin, when we deal with local races as having been subjected only to a selection *directly* differentiating a comparatively few characters.

If selection has changed a race from a condition A to a condition B, it becomes of much interest to determine the nature of the selective death-rate by which the process has been carried on, and it is found that this death-rate as represented in the surface of survival rates enables us to distinguish two kinds of selection, termed in the memoir positive and negative selection. In the first case, a race is modified, because the nearer its members are to having their organs with a certain system of values, the better fitted they are to survive; in the second case, the nearer the individuals are to this system the less fitted they are to survive. There will usually be in this second case, not a single system, but an indefinite number of systems which would equally well fit individuals to survive; in the first case, on the other hand, there are an indefinite number of systems which equally unfit their owners for surviving. This distinction seems of considerable interest.

For example, to select from the French race a race in femur and humerus like the Aino, we should have to proceed by a positive selection; but to select from the Aino a race like the French, we should have to proceed by a negative selection. To get 1000 Aino we should have to select for these two organs alone out of some 6,000,000 Frenchmen, but to get 1000 Frenchmen from the Aino we must select from about a billion of the latter. Thus we are to some extent able to appreciate the stringency of the selection, which even lasting through long ages, and introducing continuous reproduction, would be needful to enable us to pass in the case of only two organs from one race to the other. Another point brought out by the surface of survival-rates is the fact that the fittest to survive are usually not the most frequent survivors.

It will be seen that the memoir opens up a novel field of investigation, but one so wide that the theory of it must be limited by close contact with what is needful for the purposes of evolution. We want measurements on the local races of animals to guide us; at present we know scarcely in any one case whether differentiation has taken place by *direct* selection of few or of many organs. When once such measurements are forthcoming we shall have firmer ground to go upon, and the processes of the present memoir seem to suggest how in the future we shall be able to link together quantitatively local races, and possibly at a more remote date obtain quantitative conceptions of the stages of evolutionary descent itself.

January 30.—"The Specific Volumes of Oxygen and Nitrogen Vapour at the Boiling-point of Oxygen.' By James Dewar, M.A., D.Sc., LL.D., F.R.S.

In a paper on "The Boiling-point of Liquid Hydrogen determined by Hydrogen and Helium Gas Thermometers" the author pointed out that a constant-volume gas-thermometer filled with oxygen gas, having a pressure at 0° C. of about 800 mm., gave a very accurate value of the boiling-point of liquid oxygen. As it seemed advisable to confirm this result indirectly, an attempt was made to determine the vapour density of oxygen at its boiling-point by direct weighing, the intention being, if the experimental results proved at all encouraging, to repeat the work on a larger scale and with greater precautions. As at present there is no likelihood of the more accurate determinations being made, the results of the preliminary inquiry are presented to the Society. They give in any case, with considerable accuracy, the specific volumes which have never been directly determined.

In order to obviate any question of the buoyancy of the air, two flasks A and B of as nearly as possible the same air displacement were counterpoised on an Œrtling balance. The B flask remained permanently on one scale of the balance during all the weighings, while the A flask was weighed, either exhausted or filled with oxygen (or nitrogen), in various circumstances according as the experiments required.

As the intention was not only to ascertain the density of oxygen and nitrogen at their respective boiling-points under atmospheric pressure, but also under diminished pressure, experiments were made with nitrogen at ordinary temperatures and at pressures varying from about one-sixth of an atmosphere to ordinary pressures, in order to find the range of variation in the results with the 316 c.c. flask to be used in the subsequent low-temperature experiments.

Experiments with nitrogen give a mean value of 1·260 grammes, at standard temperature and pressure, as the weight of a litre of the gas. This is about a quarter per cent. higher than the accepted value of 1·257. The extreme variation in the individual experiments is about half a per cent. The average value of the results under about one-third of an atmosphere is 1·266 grammes, the tendency under the low pressures being to make the density half a per cent. higher. Considering that in the actual low-temperature experiments the mass of gas to be weighed would be at least three times greater, it was inferred that in spite of difficulties of manipulation and corrections, the results might be anticipated to lie within a half per cent. of the true value.

The mean weight, given by six experiments, of one litre of oxygen vapour at 760 mm. and 90°·5 absolute was found to be 4·420 grammes, and the specific volume 226·25 c.c. If the first two experiments are eliminated on the assumption that the proper equilibrium of temperature had not been attained, the average weight per litre would become 4·428 grammes, and the specific volume 225·82.

Taking Regnault's density of oxygen at 0° and 760 mm., the density at 90°·5 in the ordinary way would be 0·0043137, and the specific volume 231·82 c.c. Thus the volume given by the ordinary gaseous laws is 1·0246 times the average observed volume; or we may put it that pv is diminished at the boiling-point of oxygen by 2·46 per cent. Again, while the ratio of the absolute temperatures is 3·017, the ratio of the densities is 3·091.

Further experiments were made on oxygen vapour at 90°·5 and under reduced pressures. If the first three experiments are averaged (the pressures being close together), the weight of a litre of oxygen at 90°·5 absolute under a pressure of 282·5 mm. would be 1·5982 grammes. The ratio of this density to the value previously found for one atmosphere pressure, viz. 4·42 grammes, is 2·765, and the ratio of the pressures is 2·690. It appears that the ratio of the change of density of the vapour of oxygen at 90°·5 absolute, under variable pressure, is greater than the ratio of the change of pressure. It is clear, however, that it would be necessary to work upon a larger scale in order to get satisfactory vapour densities at low temperatures under pressures below that of the atmosphere.

Observations were made on the density of nitrogen vapour at the boiling-points of liquid oxygen and liquid air respectively.

Two experiments were made with liquid oxygen taken to be at temperature 90°·5 absolute. Four experiments were made in one and the same sample of liquid air, with rising temperature. The first two experiments made with liquid oxygen give a ratio of the nitrogen densities from the author's own values of 3·088, the absolute temperature ratio being 3·017, his values for the ratio of the oxygen densities for the same range of temperature being 3·091 as previously deduced. It may be safely assumed that if the density of nitrogen were observed at its boiling-point it would deviate as much from the ordinary gaseous laws as oxygen. Further, the specific volume of nitrogen at its boiling-point of 78° absolute would from the above formula be 221·3 as compared with 226·2, the similar value found for oxygen.

The general inference to be drawn from these preliminary experiments is that trustworthy vapour densities may be determined at very low temperatures. There seems to be no reason why the vapour density of hydrogen at its boiling-point should not be accurately ascertained; only, as in this case the internal pressure in the weighing flask would amount to nearly fifteen atmospheres, it would be advisable to construct the flask of some metal or alloy. A flask of the size used in the oxygen experiments filled with the vapour of hydrogen at its boiling-point would be equivalent in weight to between four and five litres of hydrogen at the ordinary temperature and pressure, and such an amount of material ought to give density results at the boiling-point of hydrogen of considerable exactness, notwithstanding the great manipulative difficulties that would necessarily be involved in the execution of such a determination at 21° absolute.

Physical Society, February 14.—Annual General Meeting.—Mr. T. H. Blakesley, vice-president, in the chair.—Prof. S. P. Thompson, F.R.S., was re-elected president. Prof. S. P. Langley and Prof. H. A. Lorentz were elected honorary fellows to fill the vacancies caused by the deaths of Prof. Rowland and Dr. Koenig. The president of the German Physical Society was elected an *ex-officio* fellow of the Society.—The secretary then read the president's address. It commenced by giving some particulars of the life and work of Rowland, Koenig, Langley and Lorentz. On January 11 a telegram was sent, in the name of the Society, to Prof. Hittorf congratulating him upon the jubilee of the professoriate. The work of translation, revision and production of an English version of Gilbert's "De Magnete" has been completed, and a copy of the book presented to the Society by the president. The remainder of the address dealt with the refusal of the law of this country to recognise as valid matter for the granting of letters patent anything which may have been brought before any of the learned or scientific societies. In the United States a man may appeal to the fact of his having read such a paper in proof of his subsequent claim to receive a valid patent for his nvention. The law in this country works very inequitably. As examples, the invention of the microphone by the late Prof. Hughes, the president's invention of the "astigometer" and the invention of wireless telegraphy by Prof. Lodge were given.—An ordinary meeting of the Society was then held, at which Mr. Littlewood exhibited an Attwood's machine.—The Society then adjourned until February 28.

Chemical Society, February 6.—Dr. Armstrong, F.R.S., in the chair.—An investigation into the composition of brittle platinum, by Prof. Hartley, F.R.S. Platinum points repeatedly heated in the course of dental practice become very brittle, owing, the author believes, to the presence of minute quantities of carbon and phosphorus, although such impurities could not be definitely detected.—Conversion of 1-hydroxycamphene into β-halogen derivatives of camphor, by Dr. M. O. Forster. The author finds that his supposed "enolic" form of camphor is really 1-hydroxycamphene, and has studied the action of halogens upon it, so obtaining the various β-substituted camphors.—Tetrazoline, ii., by Messrs. Ruhemann and Stapleton. The action of methyl iodide upon this substance gives rise to several derivatives of unknown relation to tetrazoline.—The solubilities of the calcium salts of the lower fatty acids, by Dr. Lumsden. The author has investigated the influence of temperature upon the solubilities of these salts, and has shown that, with the exception of the formate, they decrease in solubility with increase of temperature. The salts of the normal acids show increasing solubility as the series is ascended, but are less soluble than the corresponding *iso*-salts.—The equilibrium between a solid and its saturated solution at various temperatures, by Dr. Lumsden. The solubility of a substance is affected by three factors—the solution pressure of the dissolved molecules, the thermal energy of dissociation of the substance, and the affinity, if any, of solvent and solute. The solubility curve (temperature, weight of substance) may be regarded as expressing a series of equilibria between these influences at the various temperatures included in the curve, and from this point of view it is shown that the solubility curves of calcium salts are not abnormal.—On the union of hydrogen and chlorine, iv., by Messrs. Mellor and Anderson. The momentary expansion in mixtures of these gases, brought about by exposure to a brilliant light, is shown to be associated with their combination and, it is suggested, is caused by some disturbance resulting from the latter.—The influence of temperature on association in benzene solution and the value of the molecular rise of boiling-point for benzene at different temperatures, by Dr. W. R. Innes. With increase of temperature, the complex molecules of phenanthrene, benzophenone, benzil, &c., produced in their solutions in benzene, become simpler up to 80°; beyond that point certain (at present) unexplained anomalies appear.—The magnetic rotation of ring compounds, camphor, limonene, carvene, pinene and some of their derivatives, by Dr. W. H. Perkin, sen. It is shown that the observed rotations of these substances agree closely with those calculated from the formulæ generally assigned to them.—Note on the constitution of certain organic nitrates, by Messrs. Marshall and Wigner. The authors express dissent from the view of Vignon and Gerin that mannitol hexanitrate contains a substituted aldehyde group, since the reducing action of the substance can be explained without such an assumption, and, moreover, the amount of nitrous acid formed on hydrolysis does not accord with the structure suggested.—Resolution of trimethylhydrindonium hydroxide into its optically active constituents, by Prof. F. S. Kipping, F.R.S. The deracemisation of this substance has been brought about by conversion into a salt of *d*-bromocamphorsulphonic acid and crystallisation from chloroform and acetic ether when the salt of the dextro-base separates first.—Resolution of methylbenzylacetic acid into its optical isomerides, by Prof. F. S. Kipping, F.R.S. Crystallisation of the quinine salt of the racemic form of this acid leads to the separation of the alkaloidal salt of the dextro-acid in the first fractions.—*d*-Methylhydrindone, by Prof. F. S. Kipping, F.R.S. This substance was obtained from the chloride of dimethylbenzylacetic acid by interaction with aluminium chloride. It rapidly racemises when heated, probably as the result of conversion into the 'enolic' form. It reacts with hydroxylamine, phenylhydrazone and semicarbazide, furnishing the various ketonic derivatives.—Optically active methylbenzylacetic acid, by Dr. Lapworth and Mr. Lenton. A repetition of the work described by Dr. Kipping in part ii.

Mineralogical Society, February 4.—Dr. Hugo Müller, president, in the chair.—Messrs. G. T. Prior and L. J. Spencer contributed a paper on the hornsilvers. They described specimens of silver haloid containing all the three halogens, chlorine, bromine and iodine, in large amount, and showed by quantitative analyses that in these holohedral cubic "iodiferous embolites" the chloride, bromide and iodide of silver could enter into isomorphous combination in very varying proportions besides the particular one found by Lasaulx in iodobromite; fusion experiments indicated that the limiting amount of silver iodide which could enter into such isomorphous combination was reached for mixtures containing the three halogens in equal atomic proportions. As the result of the investigation, the authors proposed to include all the holohedral cubic silver haloids under the common group name of hornsilver or cerargyrite, and to use the names "chlorargyrite," "bromargyrite," "embolite" and "iodiferous embolite" to indicate subspecies depending on variations in the proportions of chloride, bromide and iodide.—Mr. G. T. Prior described specimens of kilbrickenite contained in the museum of the Mining School at Camborne, Cornwall; the result of an analysis, combined with an examination of the physical characters, was to prove the identity of kilbrickenite with geocronite. He also gave the results of analyses of miersite ($\mathrm{4AgI.CuI}$), of marshite (CuI) and of peculiar crystals of copper-pyrites simulating cubic symmetry.—Messrs. G. T. Prior and A. K. Coomára-Swámy gave an account of the mode of occurrence and characters of "serendibite," a new boro-silicate from Ceylon. This new mineral, which is of a beautiful blue colour, was discovered by Mr. Coomára-Swámy in intimate association with diopside in narrow contact zones between an acid, moonstone-bearing granulite and limestone which occur in alternating bands at Gangapiliya, twelve miles east of Kandy; no distinct crystals could be isolated, but examination of thin slices of the rock showed the mineral to be biaxial and probably triclinic; it was very pleochroic, from colourless to deep indigo-blue, and almost invariably showed a remarkable repeated twinning on as intimate a scale as the albite twinning of a plagioclastic felspar; the double-refraction is weak, but the refraction nearly as high as diopside; the hardness is about 7, the specific gravity 3·42; no cleavage was observed; it is infusible and is only slightly attacked by acids. Analysis showed the mineral to be a complex and very basic borosilicate of alumina, lime, magnesia and iron with small amounts of alkalis including lithia.—Prof. H. A. Miers exhibited three-colour collotype prints of the interference figures of crystals. These were obtained by photographing the figures through colour screens by means of a large Newton polariscope. Some of the prints reproduced with considerable success the colours and the symmetry of the original figures. The work has been executed at the Oxford University Press. He further exhibited calcite twins of a rare type from a new locality in Somersetshire, and also some crystalline gold nuggets from Klondyke.

PARIS.

Academy of Sciences, February 10.—M. Bouquet de la Grye in the chair.—On a very powerful specific treatment for malaria, by M. Armand Gautier. A detailed account of the cure of nine cases of malarial fever by the injection of sodium methylarsenate. These cases, which had all proved refractory to high doses of quinine, were, with the exception of two, immediately cured by the injection of a single dose of the methylarsenate. The remaining two cases were successfully treated with a second injection.—On the crystallisation of chromium sesquioxide, by M. Alfred Ditte. The crystallisation of chromium oxide during the calcination of a bichromate with common salt is shown to be due to the properties of sodium chlorochromate, and is in no way influenced by the solubility of the oxide in the alkaline chloride.—The determination of the exact trajectory of aërostats with respect to the soil, by M. H. Deslandres. A curve of the trajectory of the aërostat of M. Dumont on the ascent of October 19 is given and compared with the curve previously given by M. Armengaud. The two curves differ from each other considerably, the author pointing out that his own, which is deduced by a photographic method, is more likely to be accurate than that of M. Armengaud.—Radioconductors with a single contact, by M. Édouard Branly. The author has followed up some of his earlier experiments on radioconductors of one contact only, and describes two or three types which have proved very sensitive. The combination of a superficially oxidised metal with a highly polished metal has proved to be the most trustworthy, giving the greatest variation of resistance when exposed to the Hertzian waves.—The application of thermal galvanometers to the study of electric waves, by M. L. de Broglie.—The tubes of force of the magnetic field rendered visible by means of the kathode rays, by M. H. Pellat. In an intense magnetic field, the bundle of kathode rays which escapes from a kathode in the form of a plateau corresponds exactly to the tube of magnetic force having for its base the surface of the kathode.—On the condensation of true acetylenic hydrocarbons with aldehydes: the synthesis of secondary acetylene alcohols, by MM. Ch. Moureu and H. Desmots. The sodium derivatives of the acetylene hydrocarbon react readily with aldehydes in ethereal solution at − 5° C. The method is perfectly general, and ten new alcohols of this type are described.—On some iodophenols, by M. P. Brenans.—The action of crystallised arsenic acid upon pinene, by M. P. Genvresse. Arsenic acid does not act as an oxidising agent towards pinene as was expected, the principal products being either pinene possessing a different smell from the original or a terpinene, according to the proportion of arsenic acid employed.—The vascularisation of the suprarenal bodies in the dogfish, by M. Ed. Grynfeltt.—On *Menabea venenata* the roots of which furnish the *Tanghin de Menabe*, or *Sakalaves*, the poison of the ordeal, also called *Kissoumpa* or *Kimanga* in Madagascar, by M. Ed. Heckel.—On the effects of commensalism of an *Amylomyces* and of a *Micrococcus*, by M. Paul Vuillemin. The association of *Mucor rouxianus* and a *Micrococcus* feeding on sugar allows of the development of the bacterium on potato.—The discovery of a new horizon of a lacustral fossiliferous limestone interposed between the Miocenes of Ariege, by M. G. Vasseur.—On the alkaline granite of Filfila, Algiers, by M. Pierre Termier.—A new method of local anæsthesia in dentistry, by MM. L. R. Regnier and Henry Didsbury. The researches of M. d'Arsonval on the anæsthetic effects produced by currents of high frequency and high intensity have been applied with success to the purposes of practical dentistry.—An apparatus for the blind, by M. Dussaud.

GÖTTINGEN.

Royal Society of Sciences.—The *Nachrichten* (physico-mathematical section), part ii., 1902, contains the following memoirs communicated to the Society:—

July 20, 1901.—A. von Koenen: on the correlation of the North-German Lower Chalk.—J. Orth: contributions from the Göttingen Pathological Institute: (*a*) ætiology of caseous pneumonia; (*b*) tubal gravidity; (*c*) the lower jaw in so-called agnathia; (*d*) pseudo-tuberculosis; (*e*) soft cutaneous nævi; (*f*) epidermal ingrowths in cancer; (*g*) pericardial cicatrices; (*h*) renal degeneration after cœliotomy; (*i*) the testicular elastic tissue in tuberculosis and syphilis; (*j*) angiomatous changes in the liver after poisoning by coumarin.—J. Orth: histology and ætiology of pulmonary phthisis.

November 8, 1901.—W. Kaufmann: electric and magnetic deflexion of the Becquerel rays, and the apparent mass of electrons.—A. Brill: on the representation of an algebraic tortuous curve by one equation.

DIARY OF SOCIETIES.

THURSDAY, February 20.

Royal Society, at 4.30.—On Pure Cultures of a Uredine *Puccinia dispersa* (Erikss): Prof. H. M. Ward, F.R.S.—On the Physics and Physiology of Protoplasmic Streaming in Plants: Dr. A. J. Ewart.—On a Pair of Ciliated Grooves in the Brain of the Ammocœte, apparently serving to promote the Circulation of the Fluid in the Brain-Cavity: Prof. A. Dendy.—On the Interpretation of Photographic Records of the Response of Nerve obtained with the Capillary Electrometer: G. J. Burch, F.R.S.—Note on the Anomalous Dispersion of Sodium Vapour: Prof. W. H. Julius.

Linnean Society, at 8.—(1) On some Gasteropoda (*Limnotrochus* and *Chitra*) from Lake Tanganyika, with the Description of a New Genus; (2) On the Nyassa Vivipara and its Relationship to Neothauma: Miss L. Digby.—On the Fruit of *Melocarina bambusoides*, an Exalbuminous Grass: Dr. A. Stapf.—On a West Indian Sea Anemone, *Bunodeopsis globulifera*: Dr. J. E. Duerden.

FRIDAY, February 21.

Royal Institution, at 9.—Musical and Talking Electric Arcs: W. Duddell.

Institution of Mechanical Engineers, at 8.—Annual General Meeting. Followed by discussion on Modern Machine Methods, with Reply by the Author, H. L. F. Orcutt, and, time permitting, Fencing of Steam- and Gas-Engines: H. D. Marshall.—Fencing or Guarding Machinery used in Textile Factories: S. R. Platt.—Protection of Lift-Shafts, and Safety Devices in connection with Lift-Doors and Controlling Gear: H. C. Walker.—Guarding Machine Tools: W. H. Johnson.

Geological Society, at 3.—Annual General Meeting.

Epidemiological Society, at 8.30.

SATURDAY, February 22.

Royal Institution, at 3.—Some Electrical Developments: Lord Rayleigh, F.R.S.

Essex Field Club (at Essex Museum of Natural History, Stratford), at 6.30.—George Edwards, the Stratford Naturalist: John Avery.—Protective Resemblance, Warning Colours and Mimicry, some New Illustrations of well-known Principles: Prof. E. B. Poulton, F.R.S.

MONDAY, February 24.

Royal Geographical Society, at 8.30.—The Voyage of the Antarctic Ship *Discovery*: The President; G. Murray, F.R.S.; and Dr. H. R. Mill.

Society of Arts, at 8.—Personal Jewellery from Prehistoric Times: Cyril Davenport.

Imperial Institute, at 8.30.—British Columbia: Hon. J. H. Turner.

Institute of Actuaries, at 5.30.—Some Notes on the Net Premium Method of Valuation, as affected by recent Tendencies and Developments: S. G. Warner.

TUESDAY, February 25.

Royal Institution, at 3.—The Temperature of the Atmosphere: W. N. Shaw, F.R.S.

Institution of Civil Engineers, at 8.—*Paper to be further discussed*: Electrical Traction on Railways: W. M. Mordey and B. M. Jenkin.

Society for the Promotion of Hellenic Studies, at 5.—Humour in Greek Art: A. H. Smith.

WEDNESDAY, February 26.

Society of Arts, at 8.—Recent Inventions in Weaving Machinery: Prof. Roberts Beaumont.

Geological Society, at 8.—On some Gaps in the Lias: E. A. Walford.—The Origin of the River-System of South Wales and its Connection with that of the Severn and Thames: A. Strahan.

THURSDAY, February 27.

Royal Society, at 4.30.

Society of Arts at 4.30.—The Industrial Development of India Nilkanth B. Wagle.

Institution of Electrical Engineers, at 8.—Electric Shock and Legislation thereon: Major-General C. E. Webber, C.B., R.E.—Electric Shocks: F. B. Aspinall.—Electric Shocks at 500 volts (illustrated by a Demonstration of 500 volts): A. P. Trotter.

FRIDAY, February 28.

Royal Institution, at 9.—Gold Mining in Klondyke: Prof. H. A. Miers, F.R.S.

Institution of Civil Engineers, at 8.—Indicating High-Speed Steam-Engines: A. M. Arter.

CONTENTS.

PAGE
Planarians and their Allies 361
Primary Batteries. By M. S. 362
A Memoir on Moraines. By T. G. B. 362
Chemistry of Paints 363
Our Book Shelf:—
  Price: "Handbook of Sanitation" 364
  Schuster and Lees: "Advanced Exercises in Practical Physics."—**S. S.** 364
  Hemsalech: "Recherches Expérimentales sur les Spectres d'Étincelles."—**C. P. B.** 365
  Jordan: "Moral Nerve and the Error of Literary Verdicts" 365
  Lush: "Domestic Economy for Scholarship and Certificate Students" 365
Letters to the Editor:—
  Huxley's Review of the "Vestiges of Creation."—**Francis Darwin, F.R.S.** 366
  Birds attacking Butterflies and Moths.—**A. H. Hamm; C. G. Seligmann; Howard Fox** . . 366
  King Og's Bed.—**T. B. S.; H. G. Wells** 366
  The Severn Bore.—**E. W. Prevost** 366
  Squilla desmaresti.—**Prof. F. Jeffrey Bell** 366
  The Moon and Thunderstorms. (*With Diagram.*)—**Alex. B. MacDowall** 367
  Progressive Variation in the Malayan Peacock-Pheasant.—**F. Finn** 367
  The Inheritance of Mental Characters.—**Prof. T. D. A. Cockerell** 367
Iceland. By Sir Arch. Geikie, F.R.S. 367
Nature Study in Schools 369
A Doubtful Development of Locomotive Engineering. By N. J. L. 370
Notes 370
Our Astronomical Column:—
  The New Bruce Spectrograph for the Yerkes Refractor 374
The Stratifications of Hydrogen. (*Illustrated.*) **By Sir William Crookes, F.R.S.** 375
Scientific Work of the German Antarctic Expedition 378
The Use of Anatomical Characters in the Identification of Wood. (*Illustrated.*) **By Herbert Stone** . 379
Conference on School Gardens 380
University and Educational Intelligence 380
Scientific Serial 381
Societies and Academies 381
Diary of Societies 384